Updating California's Sea-level Rise Guidance

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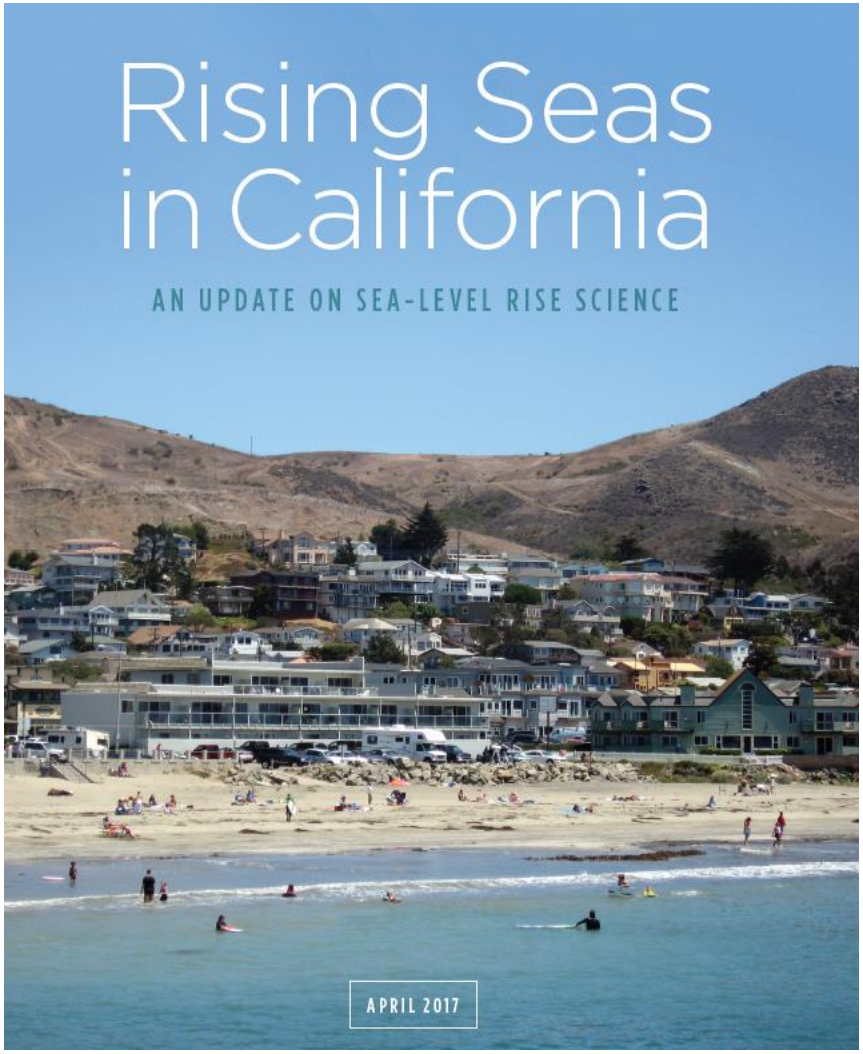
Recently released science report



OPC-SAT Working Group

- Gary Griggs, *University of California Santa Cruz*
- Dan Cayan, *Scripps Institution of Oceanography*
- Claudia Tebaldi, *National Center for Atmospheric Research & Climate Central*
- Helen Amanda Fricker, *Scripps Institution of Oceanography*
- Joseph Arvai, *University of Michigan*
- Robert DeConto, *University of Massachusetts*
- Robert E. Kopp, *Rutgers University*

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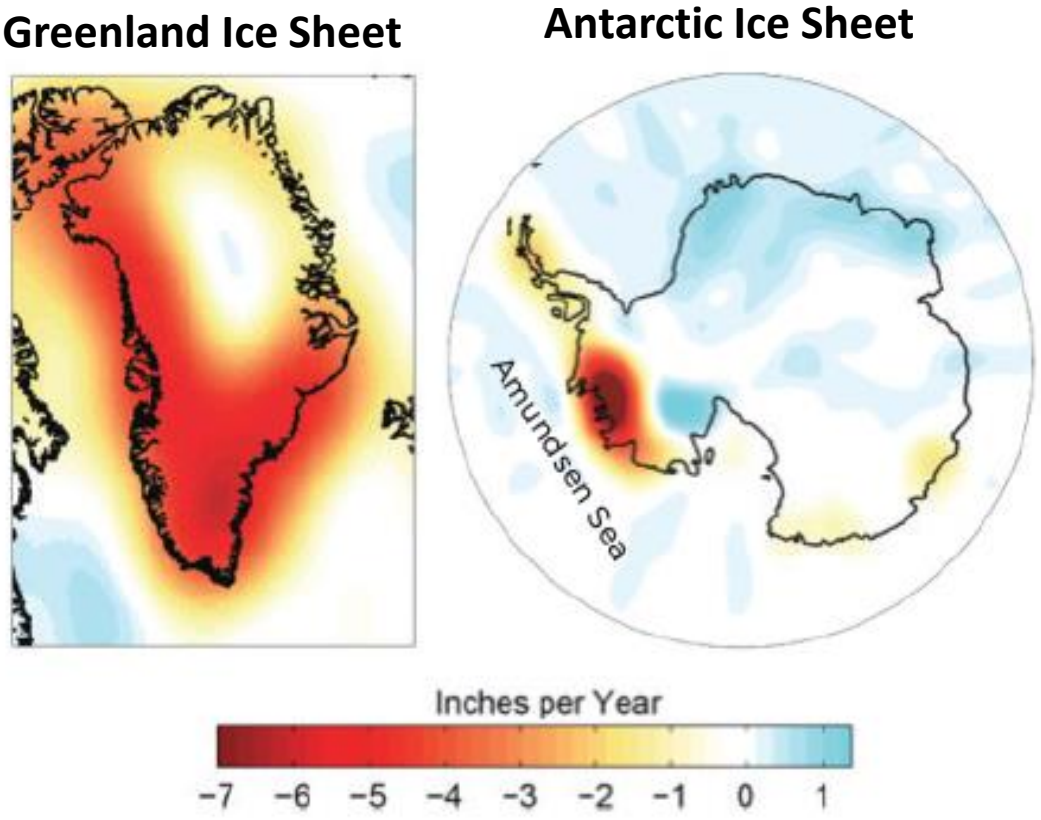
Science Advisory Team

Global mean sea-level rise

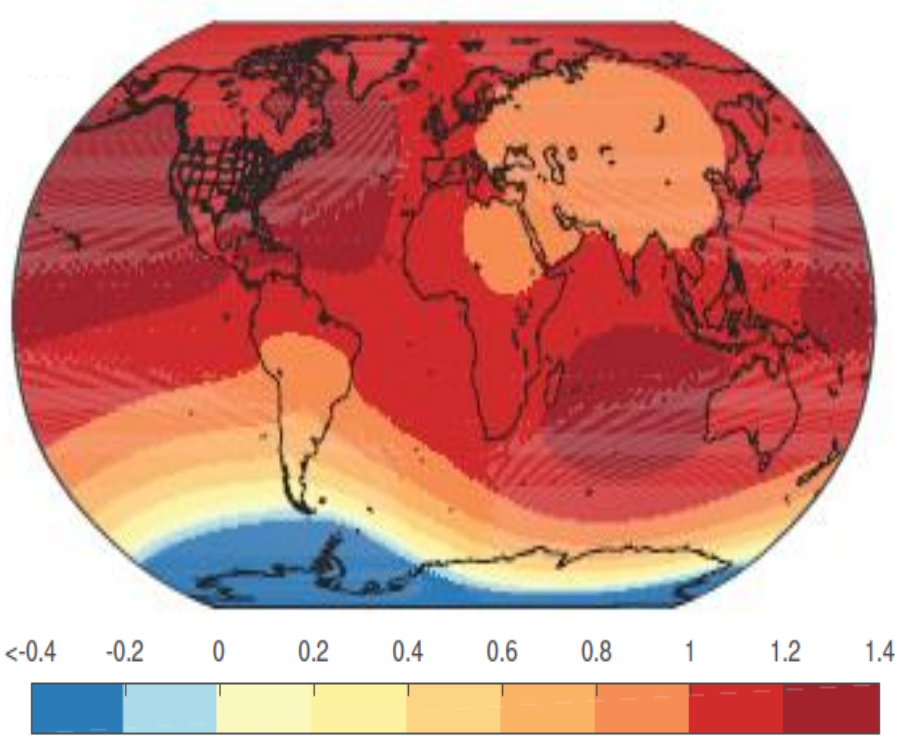
- Sea levels are rising and the rate is accelerating.
- Satellite altimetry reveals a rate of 1.3 inches/decade
- Sea levels are rising from ocean thermal expansion, land ice melting and loss of ice from polar ice sheets.

Recent observations of ice loss



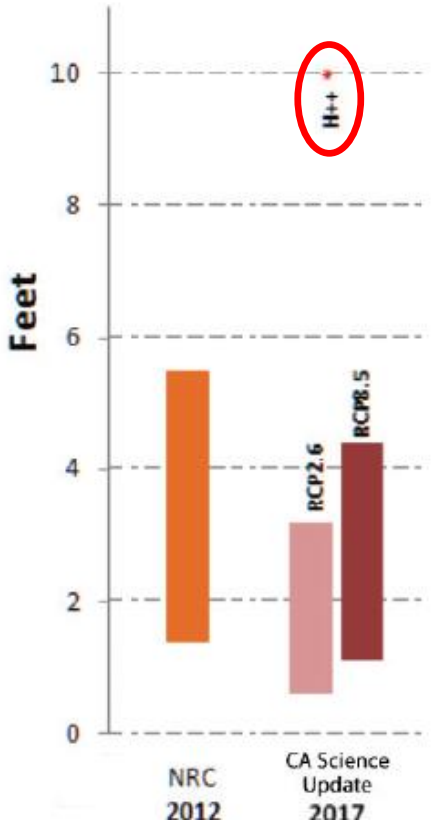
Loss of ice from the Greenland and Antarctic ice sheets will soon become the dominant source of sea-level rise

Sea-Level ‘Fingerprints’



For every foot of global sea-level rise caused by the loss of ice on West Antarctica, sea-level will rise about 1.25 feet along the California coast.

Updating California projections



- Adopting a probabilistic approach developed by Kopp et al., 2014
- Comprehensive probability distributions for sea-level rise
- Projections conditional on emissions scenarios
- Localized projections

The H++ Scenario

- A future scenario; not a probabilistic projection
- Developed for 4th National Climate Assessment
- ‘Extreme’ scenario of 8 ft global sea-level rise
- Incorporates the impacts of rapid Antarctic ice loss

Sea-level Rise Projections:

San Francisco, Golden Gate

Feet above 1991-2009 mean	MEDIAN	LIKELY RANGE	1-IN-20 CHANCE	1-IN-200 CHANCE
Year / Percentile	*50% probability SLR meets or exceeds...*	*67% probability SLR is between...*	*5% probability SLR meets or exceeds...*	*0.5% probability SLR meets or exceeds...*
2030	0.4	0.3 – 0.5	0.6	0.8
2050	0.9	0.6 – 1.1	1.4	1.9
2100 (RCP 2.6)	1.6	1.0 – 2.4	3.2	5.7
2100 (RCP 4.5)	1.9	1.2 – 2.7	3.5	5.9
2100 (RCP 8.5)	2.5	1.6 – 3.4	4.4	6.9
2100 (H++)	10			
2150 (RCP 2.6)	2.4	1.3 – 3.8	5.5	11.0
2150 (RCP 4.5)	3.0	1.7 – 4.6	6.4	11.7
2150 (RCP 8.5)	4.1	2.8 – 5.8	7.7	13.0
2150 (H++)	22			

‘Exceedance” Probabilities

RCP 8.5: San Francisco, Golden Gate

	1 FT.	2 FT.	3 FT.	4 FT.	5 FT.	6 FT.	7 FT.	8 FT.	9 FT.	10 FT.
2020										
2030	0.1%									
2040	3.3%									
2050	31%	0.4%								
2060	65%	3%	0.2%	0.1%						
2070	84%	13%	1.2%	0.2%	0.1%					
2080	93%	34%	5%	0.9%	0.3%	0.1%	0.1%			
2090	96%	55%	14%	3%	0.9%	0.3%	0.2%	0.1%	0.1%	
2100	96%	70%	28%	8%	3%	1%	0.5%	0.3%	0.2%	0.1%
2150	100%	96%	79%	52%	28%	15%	8%	4%	3%	2%
2200	100%	97%	91%	80%	65%	50%	36%	25%	18%	13%

Rapidly advancing science

- Waiting for scientific certainty is neither a safe nor prudent option
- Current scientific understanding and user-centric decision support can support risk analyses and action now
- Periodic updates to scientific projections should be anticipated as understanding increases and the future unfolds

Summary: Key Findings

1. Scientific understanding of sea-level rise is advancing at a rapid pace. Periodic updates of Sea-level Rise Guidance will be necessary.
2. The direction of sea level change is clear; sea-level is rising.
3. The rate of ice loss from the Greenland and Antarctic Ice Sheets is increasing.
4. New scientific evidence has highlighted the potential for extreme sea-level rise.
5. Probabilities of specific sea-level increases can inform decisions.
6. Current policy decisions are shaping our coastal future.
7. Waiting for scientific certainty is neither a safe nor prudent option.

Next Steps

- Complete public outreach in June 2017
- Draft policy guidance
- Release for public review in Fall 2017
- Final guidance approved by the Ocean Protection Council in January 2018

Questions for the TAC:

- How is the current sea-level rise guidance being used?
- What information should be included in the updated guidance to help users incorporate sea-level rise in their decision-making?

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